State of Michigan

Revised

Environmental Impact Statement

Prepared by:

Department of Natural Resources

For

Issuance of a permit under Act 87, Public Acts of 1965 for a Sanitary Landfill in Kent County, Plainfield Township

September 30, 1975
Date

Howard A. Tanner
Director

INTRODUCTION

The present revision differs from the preceding EIS and supplement in that certain design changes for the landfill were necessitated after review of the requested geological and hydrological information not available at that time. These changes now assure protection for the environment.

Provision is now made, during the life of the project and after completion, for:

(1) complete containment of solid waste;

(2) collection and proper disposal of leachate if and when leachate develops;

(3) providing permanent isolation between the ground water and the refuse;

(4) discharge of diverted ground water;

(5) discharge of methane gas;

(6) monitoring the quality of ground water on site and discharged to the surface;

(7) correction of pollution problems should they arise.

Briefly, the Department of Natural Resources proposes to issue the first of what may be an annual license with initial stipulations, under Act 87, Public Acts of 1965, as amended, for the County of Kent to establish a sanitary landfill. All solid waste disposal site licenses expire August 31st of each year. The operations are reviewed periodically and in detail upon application for renewal to assure continued compliance with the design and operation procedures. Over a considerable period of time we have reviewed the proposed site (Exhibit I), numerous drafts of hydrogeologic reports and engineering plans with the final submission on September 18, 1975, the applicant's environmental impact statement, and the Kent-Ottawa Region

Solid Waste Management Plan and hydrologic reports which are attached. At this point it has been determined that the proposal as submitted by Kent County meets the requirements of Act 87, Public Acts of 1965, as amended. An environmental impact statement has been prepared since the proposed development has been considered a controversial action.

The Department has been involved in meetings with representatives of local groups to discuss the proposals and has permitted free access to the files and plans concerning this matter. Should there be continued request for a public hearing prior to issuing the license, such will be held.

NEED AND OBJECTIVE

Each day in Kent County about 1,000 tons of solid waste are generated, collected and buried. Existing sites for landfills are approaching capacity and new landfills are needed. Alternate methods for disposing of solid waste do not now exist nor could they possibly be available for several years or more. The Department concurs that there is need for alternate solutions and will continue to promote their development during the next few years. The license, if issued, will provide a needed method for the disposal of the daily quantity of solid waste in a manner consistent with the protection of the public health and the natural resources of the State--in other words the natural and human environment.

The objective of issuing this license is to afford the residents, business and industry of Kent County a place to dispose of their solid waste until such time as more viable solutions; such as resource recovery, and/or energy generation, become economically feasible for at least a significant part of the waste. It is estimated that this landfill will buy time for approximately half of the County's solid waste for the next 10 years, but

in no way should be considered an instrument to prevent the County from considering alternate solutions to an effective solid waste management program.

EXISTING ENVIRONMENT

Physiography

Topography:

The proposed site is located on a relatively high area of the northeast-southwest trending moraine (Exhibit II). The topography at the site is typical morainic with steeper slopes on the east, southeast and south. Highest elevation of the site is 943.3 feet (287.5 meters) above sea level which is also the highest area in Plainfield Township. Total relief on the site is about 100 feet without any significant flat areas.

Surface drainage from the highest area flows in all directions, but predominantly it flows along gradual slopes toward the north and west. Several springs and intermittent streams originate along the gullies surrounding the site and flow towards the Rogue River. The shortest linear distance to the Rogue River from the site is about 3,000 feet in a southeasterly direction. In the spring season live springs are noticeable along the north boundary of the proposed site.

Surface Soils:

According to the USDA Soil Survey Report (1926) of Kent County, predominant surface soils on the site are described as Isabella (loam) and Bellefontaine (sand loam) series. These are morainal soils and they vary in texture from loam to a sandy loam. The Isabella series normally indicates that the shallow substrate (parent material) is probably glacial till consisting of sandy clay with some gravel and boulders; whereas the Bellefontaine series

indicates that the shallow substratum is of coarse textured sandy material of glacial origin. Predominant soils on the northern half of the proposed site, towards 10 Mile Road, are sandy (Bellefontaine sandy loam); whereas soils on higher ground in the southern half of the site are loamy (Isabella loam) in nature.

Geology:

The proposed site is located on the eastern segment of the Valparaiso Morainic System which is also a part of the area (interlobate tract) built up by simultaneous activities of two glacial ice lobes (tounges) of the Wisconsinan Glacial Age. Normally, glacial geology in an interlobate area is more complex to evaluate because of intermixing of materials (see Plate 2 of 13) brought in by two ice lobes. Therefore, detailed investigation of the proposed site was requested to determine the extent, dimensions, and stratigraphic relationship of subsurface strata containing coarse and very fine materials along with the hydrology of the area. From the deep well records, bedrock (of upper Mississippian Age) appears to be over 200 feet below the surface under the proposed site.

There is a gravel pit area located to the southeast side of the intersection between Belmont Avenue and 10 Mile Road. Near surface information does not indicate any substantial quantities of economically extractable mineral deposits in the area of the proposed fill.

There is a small oil field (Rockford field) located northeast of the proposed landfill area, but the review of the information from dry wells surrounding the site indicates that there appears to be very little potential for additional oil pool(s) under the proposed 130 acres of the fill area.

Hydrology:

On-site testing and evaluation of available hydrogeologic information in the vicinity reveals the existence of at least two ground-water aquifers under the proposed landfill site.

The shallower ground-water aquifer occurs generally under water table conditions with a few localized artesian conditions where shallow clay layers are present. Several ground-water observation wells and test borings data show that the materials composing the shallower aquifer are a heterogeneous mixture of permeable sands and gravels with several layers of impermeable clays (see Plate 3). Subsurface geologic information gathered so far further indicates that below the upper shallower aquifer there exists a more or less continuous stratum of clay (see Plates 16, 17, 18 and 19) at the proposed landfill site. The thickness of this clay stratum ranges from 5 feet, at Boring No. 18, to 81 feet, at Boring No. 38. This is not the true picture of the clay thickness since several test borings were drilled shallow and terminated at only a few feet into this clay layer. To get a true picture of the thickness and continuity of this clay additional deeper test holes will be required.

Plate 4 constructed by the hydrogeological consultant, using static water levels prior to pumping, shows water table (piezometric) surface contours in its natural state (readings taken between May and September, 1974). This plate shows the ground-water flow directions and its gradient. From the proposed landfill area, ground-water flow is predominantly towards north and north-northeast directions, but it does change its direction to the west and southwest toward the southwest corner of the proposed fill area. Plate 5 shows some changes in piezometric surface contours and the resultant lowering

of the water table on April 1, 1975 after pumping.

The proposed site is topographically high and contains permeable drift materials; therefore, it acts as one of the recharge areas for the shallower aquifer. Geologic data indicates that this shallow aquifer feeds (in addition to surface runoff) the springs and intermittent streams originating at the site, and it probably provides some discharge to wells completed in this aquifer.

The second deeper ground-water aquifer under the site occurs below the aforementioned more or less continuous clay stratum, and it appears that several domestic wells in the area are drawing water from this extensive aquifer. Hydrogeologic data so far collected does not appear to show any noticeable hydraulic connection between the shallower and deeper aquifers beneath the proposed area.

More detailed descriptions of the hydrogeologic environment and related data are included in the Kent County Environmental Impact Statement and Addendums to the Statement.

Vegetation

Most of the 345 acres consists of abandoned farm fields with small trees and shrubs. There are two evergreen plantations and heavily wooded areas on the steep slopes. All landfilling will take place on the abandoned farm fields.

Wildlife

The wildlife in the area are not unique and contain no rare or endangered species. Rabbits and pheasants would be the primary game species present in the grassy-shrubby areas while squirrels inhabit the woods. Various species of songbirds are present on all areas of the site. Deer tracks may be found in the area.

The Rogue River, a quality trout stream, is approximately 4,000 feet north via the nearest established drainage course.

Archeology

There are no known archeological sites within the site since most known areas are along major drainage courses, which are absent from the project site.

PROPOSED ACTION

The Kent County Department of Public Works has been designated the agent for solid waste management with the County and has therefore proposed a solid waste disposal area site of 344.9 acres in Sections 2 and 3 of Plainfield Township. The landfill would be limited to a rectangular 200.8 acre parcel within the site of which only 130 acres would be filled eventually.

Solid waste will arrive via Ten Mile Road, which is an all-weather road that borders the tract on the north. The estimated daily fill would be 300-400 tons delivered by approximately 200 vehicles per day. Single cells 28 meters wide and averaging 200 meters in length will be excavated and filled before proceeding to the next cell. Average trench depth is around 5 meters. About 90 percent of the total property will have the same topography before and after the filling operation. In the high ground water area of the landfill proper, grades will be raised to a maximum of 10 feet and lower areas will be raised to a minimum of 20 feet.

The estimated life of the project will be 10 years, after which time the entire fill area will be covered with clay and the site turned over to the Kent County Parks Department for recreational development. A scale house with a well and a septic tank system for a service building will be built on site.

Any litter from the site and vehicles will be picked up by the Department of Public Works. All refuse in each working cell will be covered at the end of each day's fill operation to control odors and minimize windblown litter.

Ninety percent of the traffic utilizing the facility will gain access via the off-ramp from US-131, about 1,400 feet from the site and then via Ten Mile Road. Of the 200 vehicles per day, most (180) will pass by only two residences. The facility will be screened by existing trees and set back a minimum of 600 feet from Ten Mile Road.

The Kent County Department of Public Works proposes to lower permanently the piezometric surface (water table) of the upper aquifer initially by pumping and later with the construction of two proposed underdrains (north-south) which empty into a dewatering trench (east-west) parallel to Ten Mile Road north of the proposed landfill area. Kent County officials feel that dewatering the proposed fill area is necessary to eliminate the high ground water conditions. By this action, the County can use the trench method of solid waste disposal, which they feel is more feasible for operational purposes than an area type fill. The system is designed to collect leachate, if formed, and either dispose of it on the site or direct it to a county sewer.

The Department is requiring 20 feet of natural impermeable clay below the bottom of the proposed trenches. Existence of this clay will be confirmed by on-site test boring at the bottom of each trench as excavated. If on-site testing does not confirm the presence of 20 feet of clay, then these trenches will be sealed with 5 feet of compacted clay or 20 mil P.V.C. plastic. The Department is also requiring that the separation between the natural piezometric surface (see Plate 4) and bottoms of the

lined trenches should be at least 6 to 7 feet (2 meters) to allow adequate space for water table fluctuations. The County consultant's report (W. M. Meinert, August 22, 1975, page 3) indicates that the separation between the lowered water surface and the easterly ends of cells numbered 1 through 15 will be approximately 7.8 feet (2.4 meters).

Two subsurface gravel drains constructed below the level of trenches No. 31 and No. 32 (perpendicular to the main disposal trench system) will keep the water level below the bottoms of disposal trenches after pumping is stopped. Any ground water entering the gravel drain will flow northward to the intercepting and dewatering trench lying north of the site. This east-west dewatering trench will drain into a nearby small creek and eventually to the Rogue River. This system will discharge only uncontaminated ground water.

Surface water infiltration into the site will be minimized by the perimeter road and culvert system. Leachate collection and holding facilities will be developed and installed during the site operation to prevent leachate reaching the ground and surface water. A separate on-site sewer system will drain any leachate generated in the refuse trenches. The refuse trenches will be sealed on the bottom by a natural 20 feet clay base or an installed layer of 5 feet of compacted clay or a 20 mil P.V.C. plastic liner. These alternatives are shown on the engineering plans. Any leachate generated in the trench will flow by gravity to the manhole at the end of each trench. From the manhole the leachate will be pumped to the temporary lagoon which will be tightly sealed either by the presence of natural clay or by the installation of artificial lining (see Plate 9/27).

After completion of the first 15 trenches, the sewer system draining the manholes will be installed and any leachate drainage will flow by sewer

instead of being pumped to the permanent lagoon on the north side of the site, or to the municipal sewer system, depending on quantities generated.

Surface water runoff to the north will be handled by two existing culverts under Ten Mile Road. These flow into intermittent streams and then to the Rogue River above Rockford, 1.2 miles away. Estimate of ground water pumped to the surface drainage and eventually to the Rogue River show a volume of around 0.3 cfs which is not expected to have a negative impact on the river or feeder stream. The County Department of Public Works has applied to the Department of Natural Resources Bureau of Water Management for an NPDES Permit for discharge of the intercepted water. Discharge from the two underdrains and the dewatering trench is not expected to pose any problems to the Rogue River System.

In years to come, the solid waste will undergo anaerobic decomposition, generating combustible gas (including methane) in the filled trenches. The gas will be discharged through the gravel vent located at the east end of each cell. If inadequate, then the Department of Natural Resources will require additional vents to relieve the gas if and when a problem develops.

The Department on numerous occasions finds it necessary to issue sanitary licenses with stipulations covering certain design and operating details. In the Kent County project, these stipulations will be included as a part of the official license:

License Stipulations

1. The protective sand layer over the plastic liner will be 60 cm in thickness.
2. Test boring in new trench bottom to assure 20 feet of natural clay shall be one boring each 100 feet.

3. The sidewalls of all trenches requiring artificial liners will be lined to the ground surface.
4. The licensee will submit design details depicting methods of keeping the liner in place along the sidewalls.
5. Sampling of monitoring wells to be done monthly by the County Health Department as per recommendations of the Department of Public Works' consulting hydrologist and the Department.
6. The east-west dewatering trench and a gravel underdrain below cell No. 32 shall be properly constructed as a part of initial site development. The proposed gravel underdrain below cell No. 31 shall also be constructed at a future date as indicated by the County or at an early date as may be deemed necessary by the Department of Natural Resources.

ENVIRONMENTAL IMPACTS

From the thorough review and analyses of hydrogeologic data provided by Kent County, it is obvious that the proposed site is unsuitable in its NATURAL STATE for supporting a sanitary landfill. Therefore, extensive engineering modifications were recommended to provide protections to the ground and surface waters of the area and minimize damage to the existing environment.

With engineered improvements to the site, it will be made acceptable so that there will be no adverse impacts on the existing quality of ground and surface waters of the area. Ground and surface water leaving the landfill area will be periodically monitored by the County Health Department to assure that no contamination from the landfill is entering into waters flowing towards domestic wells and the Rogue River System.

The construction of the dewatering trenches and permanent lowering of the

water table may affect the magnitude of recharge to any domestic well drawing water from the shallow aquifer and situated directly down-gradient from the landfill. This effect, however, is not expected to be appreciable and should not completely deplete the recharge source. In any event, if the shallow wells in the area are depleted by the proposed action, then the County Department of Public Works has agreed to deepen the shallow wells into the deeper aquifer.

The continuous pumping and immediate construction of proposed dewatering trenches will definitely lower the piezometric surface of the shallow aquifer and it is anticipated that it will provide required (minimum 2.0 to 2.5 meters) separation between the trench bottoms and water table. This projected lowering of the piezometric surface will not reverse the ground water flow direction from the adjacent area, thereby no interference will occur with the predominant recharge to the shallow domestic wells.

The flow to the uppermost reaches of one or more small intermittent streams originating on the north side of the site may be reduced or eliminated with the construction of the dewatering trenches. Through proposed design and proper maintenance of these trenches, however, any intercepted water will be recovered and clean water can be again allowed to enter the same water course only slightly downstream from its original outlet.

With the foregoing in effect, construction of the trenches and the leachate collection and disposal systems, along with proper operations, there will occur little or no negative impacts on ground and surface waters of the area.

Approximately 14 houses are present along the periphery of the site with the nearest one approximately 1,000 feet from the disposal area. This distance is well beyond that which experience has shown that odor could be detected

from a leachate lagoon. However, if odors should become a problem, the lagoon would be discontinued and a municipal sewer installed. The site has been controversial with residents near the site and some Plainfield Township officials.

Landfilled area with final clay cover will slightly reduce immediate recharge to the shallow aquifer but the surface runoff from the area will increase the recharge to this aquifer further down slope.

Any accidental discharge of contaminants from the landfill into ground and surface water may change its quality. In the event any accidental water pollution occurs, the County will be required to take immediate protective measures to correct the problem by intercepting, collecting, and properly disposing of the affected water.

Some of the 200 acres of the field and shrubs will be unavailable for wildlife during the operation. The operation will cause a temporary loss of habitat for deer, rabbits, pheasants and ground nesting birds. Depending on later developments, some or all of the wildlife range may be regained.

An increase in traffic will probably bother some residents. The Kent County Department of Public Works will be responsible for cleaning the road of any litter from the vehicles using the site, but some litter will be inevitable.

ADVERSE IMPACTS THAT CANNOT BE AVOIDED

1. Equipment noise during the operation.
2. Additional traffic on the county road.
3. Some temporary littering.
4. Temporary loss of some of the site as a wildlife range during the operating hours.

ALTERNATIVES

1. No landfill. Such a position would not be responsive to local needs.
2. Area type fill: It was proposed by the Department of Natural Resources to dispose of solid waste at the proposed site at or near the existing ground surface by using an area type method. This method will not require dewatering of the shallow aquifer under the site, but the County did not choose this approach because their experience shows that they can best operate a landfill using trench method, in spite of the fact that they will have to lower the water table prior to starting the construction. The Department accepts that there are operational problems with the area type fill.
3. Alternate locations. According to the Department of Public Works the proposed site represents the best of those investigated, including consideration of site size, accessability to major highways, soils, and environmental impact. This site is the one recommended by the Township Engineer. Disadvantages of nine sites which were rejected by the County prior to the selection of Ten Mile Road site are discussed on pages 17 thru 19 of the attached County Environmental Impact Statement. The Department was not involved in alternate site reviews. In this we have no authority but to accept the County's recommended site if it is or can be made to comply with requirements of Act 87, Public Acts of 1965, as amended.
4. Alternate Disposal Methods.
   (a) Power plant supplementary fuel system. This is not a viable alternative in the Kent County area at this time. This system has been seriously investigated and outlets for the refuse exist, but not until 1981. In addition, periodic power plant shutdowns and noncombustible material necessitate a back-up landfill site.

(b) Board of Public Works staff reported investigating many other alternatives including baling which would result in conservation of land needs. Baling was found to be uneconomical.